

# FACILITY DIAGRAMS

## 6.1 Introduction

Section 112.7(a)(3) of the SPCC rule requires that facility owners and operators include in the SPCC Plan a diagram of the facility that identifies the location and contents of oil containers, connecting piping, and transfer stations. The diagram helps to ensure safe and efficient response actions, effective spill prevention and emergency planning, ease of Plan review by an EPA inspector, and proper implementation of the Plan by facility personnel. This chapter explains the requirement for a facility diagram, provides guidelines on the necessary level of detail, and includes several facility diagrams as examples.

### 6.1.1 Purpose

The facility diagram is an important component of an SPCC Plan because the diagram is used for prevention, planning, inspection, management, and response considerations. EPA and facility inspectors, responders, and facility personnel need to be aware of the location of all containers, piping, and transfer areas subject to the SPCC rule. The facility diagram may also assist response efforts by helping responders determine the flow pathway of discharged oil and take more effective measures to control the flow of oil. This may avert damage to sensitive environmental areas; may protect drinking water sources; and may help prevent discharges to other conduits, to a treatment facility, or to navigable waters or adjoining shorelines. The diagram may also serve to address the rule requirements by describing, pictorially, the capacity and type of oil in each container, the associated discharge/drainage controls, and the flow path of a discharge (§112.7(a)(3)(i) and (iii) and 112.7(b), respectively). Additionally, the diagram may be attached to a facility inspection checklist to identify areas, containers, or equipment subject to inspection. Diagrams may also help federal, state, or facility personnel avoid certain hazards and identify the location of facility response equipment. Finally, by informing responders of the location and content of containers, a facility diagram helps to ensure their safety in conducting response actions and to protect property.

### 6.1.2 Requirements for a Facility Diagram

A description of the physical layout of a facility, including a facility diagram, is one of the general requirements for an SPCC Plan. The 2002 revisions to the SPCC rule added a new specific requirement in §112.7(a)(3) for a facility diagram to be included in the Plan. Section

#### **§112.7(a)(3)**

Describe in your Plan the physical layout of the facility and include a facility diagram, which must mark the location and contents of each container. The facility diagram must include completely buried tanks that are otherwise exempted from the requirements of this part under §112.1(d)(4). The facility diagram must also include all transfer stations and connecting pipes. ...

Note: The above text is an excerpt of the SPCC rule. Refer to 40 CFR part 112 for the full text of the rule.

112.7(a)(3) requires that the facility diagram include the location and contents of each container, completely buried tanks (even if exempted from the SPCC requirements), transfer areas (i.e., stations), and connecting pipes. In addition to the requirement for a facility description and diagram, §112.7(a)(3) lists additional items to be addressed in an SPCC Plan, including the type of oil in each container and its capacity; discharge prevention measures; discharge or drainage controls; countermeasures for discharge discovery, response, and cleanup; methods of disposal of recovered materials; and specific contact information. Please see §112.7(a)(3) for these requirements in their entirety.

## 6.2 Preparing a Facility Diagram

Facility diagrams provided as part of an SPCC Plan often illustrate the following information:

Required by §112.7(a)(3):<sup>1</sup>

- Aboveground and underground storage tanks (including content and capacity);
- Mobile portable containers (including content and capacity);
- Hydraulic operating systems or manufacturing equipment;
- Oil-filled electrical transformers, circuit breakers, or other equipment (including content and capacity);
- Any other oil-filled equipment (including content and capacity);
- Oil pits or ponds (at production facilities);
- Oil/water separators (e.g., at tank batteries, separation, and treating facility installations associated with production facilities);
- Fill ports and connecting piping (scale of drawing permitting);
- Oil transfer areas; and
- Loading racks/unloading areas.

Recommended:

- Secondary containment structures, including oil/water separators used for containment;
- Storm drain inlets and surface waters that could be affected by a discharge;
- Direction of flow in the event of a discharge (which can serve to address the SPCC requirement under §112.7(b));
- Legend that indicates scale and identifies symbols used in the diagram;
- Location of response kits and firefighting equipment;
- Location of valves or drainage system control that could be used in the event of a discharge to contain oil on the site;
- Compass direction; and

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<sup>1</sup> Containers that have a capacity of less than 55 gallons, are permanently closed, or are otherwise exempt from the rule (with the exception of exempted underground storage tanks) are not required to be listed on the facility diagram.

- Topographical information and area maps.

In addition, for purposes of emergency response, EPA recommends, but does not require, that an owner/operator mark on a facility diagram containers that store Clean Water Act (CWA) hazardous substances (listed in 40 CFR part 116, Designation of Hazardous Substances) and label the contents of these containers (67 FR 47097).

While recognizing that SPCC Plans and their associated diagrams are facility-specific and prepared with a certain amount of PE discretion, the following information is meant to facilitate a common understanding of what EPA inspectors may expect to see in a facility diagram. The remainder of this section provides guidelines for the recommended level of detail, how specific containers and systems may be addressed, and the use of alternate facility diagrams for meeting the requirements of §112.7(a)(3).

### **6.2.1 Level of Detail**

The facility diagram should provide sufficient detail for the facility personnel to undertake prevention activities, for EPA to perform an effective inspection, and for responders to take effective measures. As with other aspects of the SPCC Plan, the facility diagram is to be prepared in accordance with good engineering practice and reviewed by the PE as part of Plan certification. Thus, the level of detail provided and the approach taken for preparing an adequate facility diagram is primarily at the discretion of the certifying PE.

### **6.2.2. Facility Description**

Section 112.7(a)(3) requires that the Plan include a description of the physical layout of the facility. In addition to marking the location and contents of each oil storage container at the facility, this description may include information on the facility location, type, size, and proximity to navigable waters, as well as other relevant information. This general facility description is often supplemented with a more specific description of containers subject to the SPCC rule to complement what is required on the facility diagram (e.g., storage capacity and content).

### **6.2.3 Oil Containers**

The facility diagram must include all containers (including oil-filled equipment) that store 55 gallons or more of oil and must include information indicating the contents of these containers (§112.7(a)(3)). The 2002 revisions to the SPCC rule established a minimum container size of 55 gallons. Pursuant to §112.1(d)(5), the rule does not apply to containers of less than 55 gallons, and therefore they do not need to be included on the facility diagram.

In situations where diagrams become complicated due to the presence of multiple oil storage containers or complex piping/transfer areas at the facility, it may be difficult to indicate the contents and capacity of the containers on the diagram itself. In order to simplify the diagram, the

PE may choose to include that information on a separate log or sheet maintained in the Plan, similar to the description outlined below for mobile/portable containers.

#### **6.2.4 Mobile or Portable Containers**

The owner/operator must state the contents and location of each container on the diagram of the facility (§112.7(a)(3)). For portable containers (e.g., drums and totes), the facility owner/operator may note the general contents of each container and provide more detailed content information on a separate sheet or log, as well as other information, such as container capacity, that the PE determines to be appropriate to adequately describe the facility. If the contents of a container change frequently, the contents may be recorded on a separate sheet or log, or on the diagram (67 FR 47097). In this case, the diagram should note that contents vary. Additionally, the PE may choose to identify an area on the facility diagram (e.g., a drum storage area) and include a separate log that can be updated by facility personnel. The PE should develop a reasonable estimate of the number of containers in the area and the capacity of the containers, and consider routine movement of the containers for the Plan. This estimate can be used to determine applicability of the rule thresholds and provide a general description of the mobile/portable containers in the Plan. The PE should also include a procedure for maintaining the log, in order to avoid PE certification of technical amendments of the Plan as the number of mobile/portable containers changes at the facility.

Mobile containers should be marked on the facility diagram in their out-of-service or designated storage area or where they are most frequently located, such as a warehouse drum storage area. The facility owner/operator and certifying PE determine how best to represent mobile/portable containers on the facility diagram, such as by developing a log or indicating primary storage areas. If mobile containers are moved throughout the facility and do not immediately return to a specified location easily identified on the facility diagram, the exact location could be addressed on a separate sheet or log. This log would complement the facility diagram and the SPCC Plan by providing further information on the specific location and contents of mobile and portable containers. In addition, the diagram must identify the final location of mobile or portable containers (as required in §112.7(a)(3)) that return to a specific designated area to comply with the specific secondary containment requirements in §112.8(c)(11). (See Chapter 4 of this document for a discussion of secondary containment requirements.)

#### **6.2.5 Completely Buried Storage Tanks**

A facility diagram must include the location and contents of *all* containers required to be addressed in the SPCC Plan (67 FR 47097 and §112.7(a)(3)). This includes exempt underground storage tanks (USTs) as well as USTs that are subject to SPCC requirements at the facility. The rationale for this requirement is to help response personnel to easily identify dangers from either fire or explosion, or from physical impediments during response activities. For example, exempted tanks may include completely buried USTs and piping systems at a gasoline service station that are subject to all technical requirements of either 40 CFR part 280 or an approved state UST program under 40 CFR part 281.

As discussed in Chapter 2 of this document, a facility may have USTs that are subject to SPCC requirements because they are deferred from compliance with some or all of the technical requirements of 40 CFR part 280 (e.g., UST systems with field constructed tanks, any UST system that stores fuel solely for use by an emergency power generator, airport hydrant fuel distribution systems). Any USTs at a facility that are subject to SPCC requirements must also be marked on the facility diagram (§112.7(a)(3)). (See the preamble to the 1991 proposed rule, 56 FR 54612, October 22, 1991.)

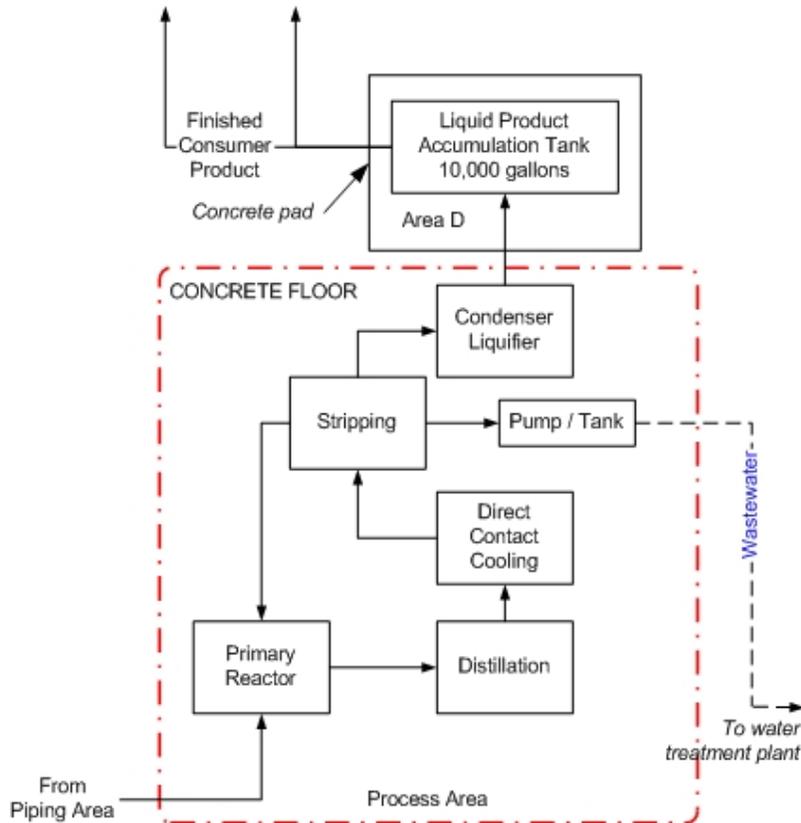
### **6.2.6 Piping and Manufacturing Equipment**

The facility diagram must also include all transfer stations (i.e., any location where oil is transferred) and connecting pipes (§112.7(a)(3)). Associated piping and manufacturing equipment present at an SPCC-regulated facility may be difficult to represent on a facility diagram, due to their relative location, complexity, or design. Recognizing this, EPA allows flexibility in the way the facility diagram is drawn. An owner/operator may represent such systems in a less detailed manner on the facility diagram in the SPCC Plan as long as more detailed diagrams of the systems are maintained at the facility and referenced on the diagram. Examples of more detailed diagrams may include blueprints, engineering diagrams, or diagrams developed to comply with other local, state, or federal requirements.

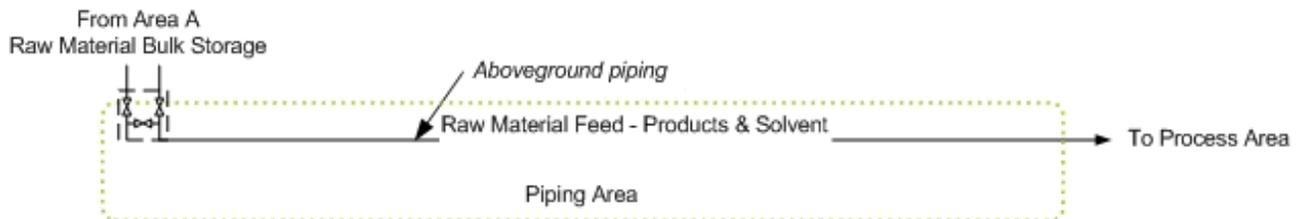
The scale and level of detail of the facility diagram may make it difficult to show small transfer lines within containment structures. Schematic representations that provide a general overview of the piping service (e.g., supply/return) may provide sufficient information when combined with a description of the piping in the Plan. Alternatively, overlay diagrams showing different portions of the piping system may be used where the density and/or complexity of the piping system would make a single diagram difficult to read.

Examples of ways that manufacturing equipment may be represented include a box that identifies the equipment and its location, or a simplified process flow diagram. Figure 6-1, which is an excerpt of a complete facility diagram (Figure 6-4) included later in Section 6.4, provides an example showing how manufacturing equipment may be represented in a facility diagram. For areas of complicated piping, which often include different types, numbers, and lengths of pipes, the facility diagram may show a simplified box labeled “piping” or show a single line that identifies the service (e.g., supply/return), as long as more detailed diagrams are available at the facility. Figure 6-2 provides an example showing how a complex piping area may be represented in a facility diagram, and is also an excerpt of the example facility diagram presented in Figure 6-4.

**Figure 6-1.** Example showing how manufacturing equipment could be represented in a facility diagram. Note that more detailed diagrams would need to be available at the facility.



**Figure 6-2.** Example showing how a complex piping area could be represented in a facility diagram. Note that more detailed diagrams would need to be available at the facility.



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### 6.2.7 Use of State and Federal Diagrams

Some state and federal regulations may require a diagram with similar or overlapping requirements, whereas others do not. SPCC is a federal program that specifies minimum requirements, which states may supplement with more stringent requirements. A facility diagram prepared for a state or federal plan or for other purposes (construction permits, facility modifications, or other pollution prevention requirements) may be used in an SPCC Plan if it meets the requirements of the SPCC rule.

## 6.3 Facility Diagram Examples

This section includes example facility diagrams for three fictitious SPCC-regulated facilities. These three examples illustrate how certain containers and equipment could be represented in a facility diagram; the examples are provided for the purpose of illustration only. Preparation of a facility diagram is a site-specific effort, and the diagram prepared for a given facility should reflect the level of detail needed to adequately describe the facility configuration. The level of detail and/or approach taken for the examples below may not necessarily be appropriate for a given facility.

It is important to note that facility diagrams, like the other elements of an SPCC Plan, must be prepared in accordance with good engineering practice, and must be reviewed by the PE certifying the Plan (§112.3(d)). Section 112.7(a)(3) requires the facility diagram to show, at a minimum, the location and contents of oil containers; completely buried storage tanks, including those that may otherwise be exempt from the rule; and transfer areas (i.e., stations) and connecting pipes. The facility owner or operator may also include on the diagram additional structures and equipment, and may use the diagram to illustrate other elements that may be relevant to the SPCC Plan and to emergency response. For instance, a diagram may also show the discharge and drainage controls that are described in the SPCC Plan, the predicted flow path for discharged oil based on topography, areas on which to focus inspections, fire-fighting resources, spill response kits, and/or evacuation routes.

Example facility diagrams are presented below for a bulk storage and distribution facility, a manufacturing facility, and an oil production facility.

### 6.3.1 Example #1: Bulk Storage and Distribution Facility

Figure 6-3 is an example of a diagram for a bulk storage and distribution facility, which has a tank farm, a loading rack and an unloading area, and other oil containers and oil-filled equipment. This diagram corresponds to the model SPCC Plan for a bulk storage distribution facility that is provided in Appendix D of this guidance document. Because it has fewer tanks and less complex operations than a manufacturing facility, for example, this facility requires a less detailed facility diagram than the example provided in Figure 6-4.

As required by §112.7(a)(3), this diagram includes all containers with an oil storage capacity of 55 gallons or greater. In addition to listing the contents directly on the diagram, the diagram

provides a reference to a supplementary table that contains the volume and content of the storage tanks shown on the diagram (appended to the diagram as Table B-1). At the discretion of the PE who reviewed and certified the Plan, the example facility diagram also depicts secondary containment methods and includes a reference to calculations of containment capacity provided in other parts of the SPCC Plan. Also, a separate log (Table B-2) identifies the contents of the drums in the storage warehouse. Please refer to Section 6.2.3 of this document for more information.

**Figure 6-3.** Example facility diagram, including loading and unloading areas.

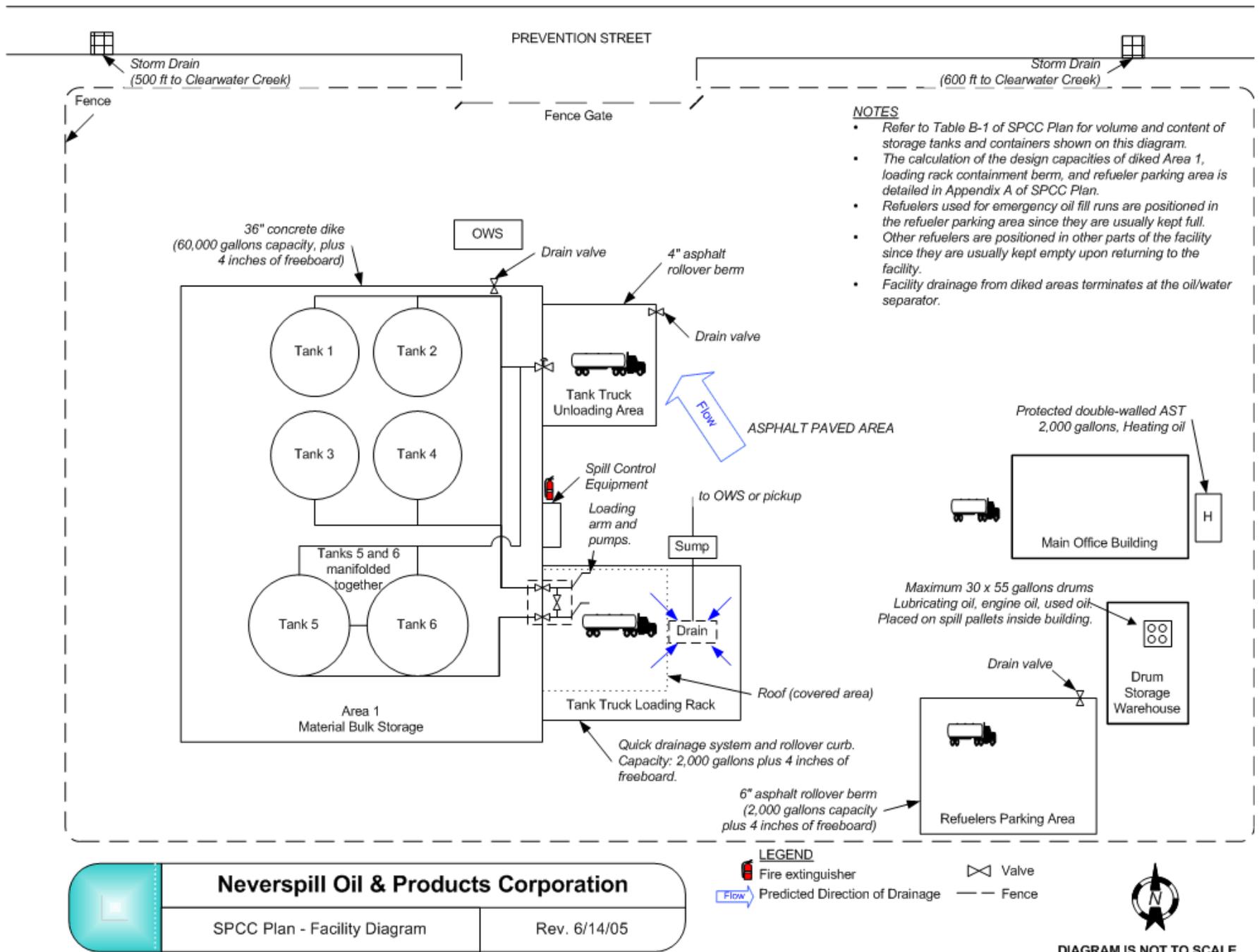


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**Table B-1.** Volume and contents of tanks and containers identified on the facility diagram. Please see facility diagram to identify the areas below.

| <b>Tank/Container</b>         | <b>Volume (gallons)</b> | <b>Contents</b>  |
|-------------------------------|-------------------------|--|
| <b>Area 1</b>                 |                         |  |
| Tank 1                        | 25,000                  | Product A – #2 fuel oil  |
| Tank 2                        | 25,000                  | Product A – #2 fuel oil  |
| Tank 3                        | 25,000                  | Product B – #6 fuel oil  |
| Tank 4                        | 25,000                  | Product B – #6 fuel oil  |
| Tank 5                        | 30,000                  | Product C – Kerosene   |
| Tank 6                        | 30,000                  | Product C – Kerosene   |
| <b>Main Office Building</b>   |                         |  |
| Tank H                        | 2,000                   | Heating oil  |
| <b>Drum Storage Warehouse</b> |                         |  |
| Up to 30 drums                | 55 (each)               | Various oil products (lubricating oil, engine oil, used oil, etc.) |

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**Table B-2.** Drum storage warehouse log.

| <b>Date</b> | <b>Number and Type of Container</b> | <b>Contents</b> | <b>Capacity</b> | <b>Location at facility</b> |
|-------------|-------------------------------------|-----------------|-----------------|-----------------------------|
| 6/14/05     | 15 drums                            | lubrication oil | 55 x 15 = 825   | Drum storage warehouse      |
| 6/14/05     | 5 drums                             | engine oil      | 55 x 5 = 275    | Drum storage warehouse      |
| 6/14/05     | 10 drums                            | used oil        | 55 x 10 = 550   | Drum storage warehouse      |
|             |                                     |                 |                 |                             |
|             |                                     |                 |                 |                             |
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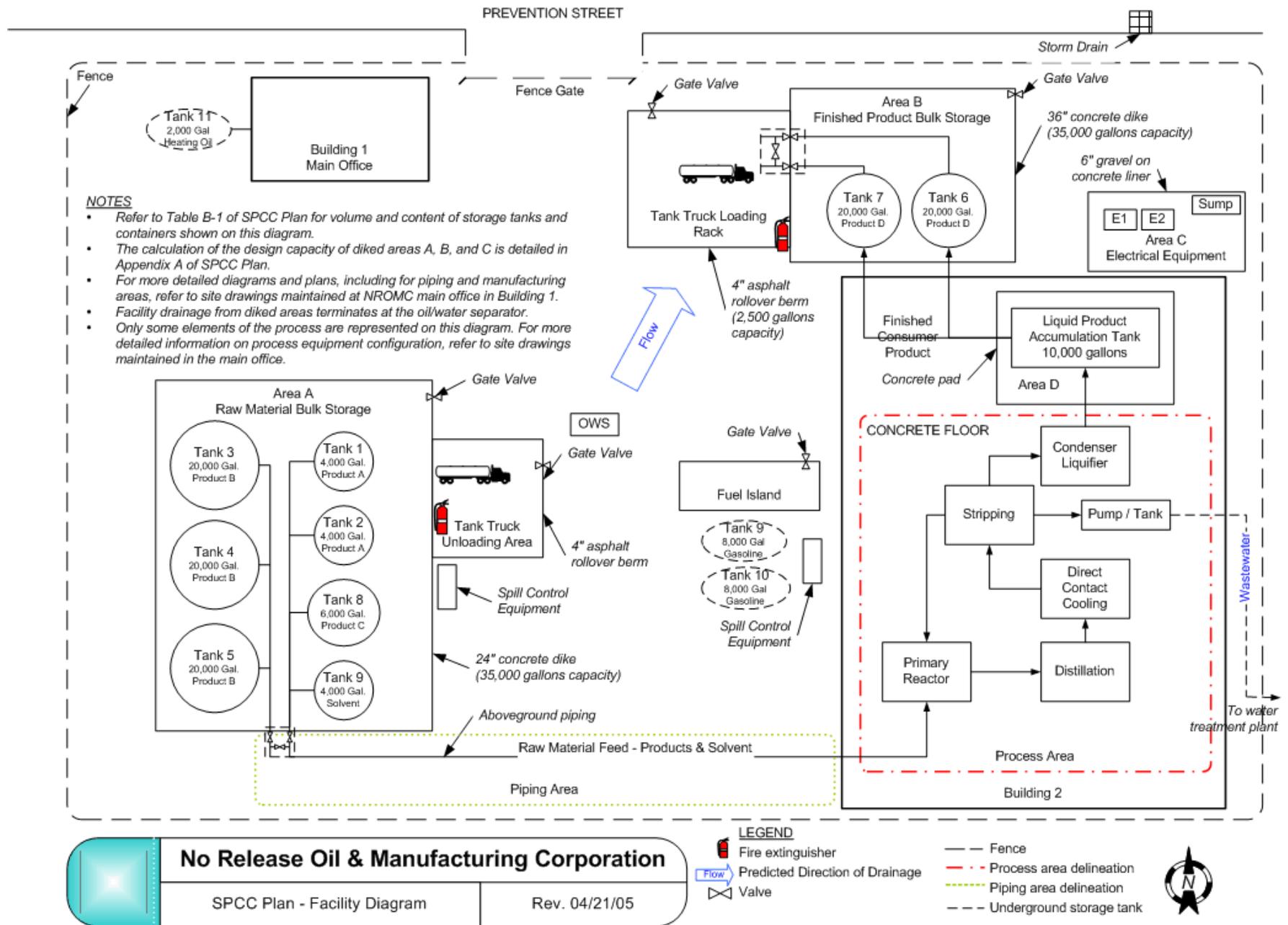
### 6.3.2 Example #2: Manufacturing Facility

Figure 6-4 is an example facility diagram for a large manufacturing facility with a variety of containers and equipment, including piping, oil-filled equipment (i.e., manufacturing equipment and transformers), and completely buried storage tanks. As required by §112.7(a)(3), this diagram includes all containers with a storage capacity of 55 gallons or greater. In addition to listing the contents directly on the diagram, it includes a reference to a crosswalk that contains the volume and content of the storage containers shown on the diagram (appended to the diagram as Table B-3). Also, while not required, the diagram marks the location of containers that store CWA hazardous substances and labels those containers. EPA would further recommend that the specific volume and specific contents of the 4,000-gallon solvent tank be included in the crosswalk. Additionally, the diagram notes the location and content of completely buried storage tanks that, although otherwise exempt from the SPCC rule because they meet all the technical requirements of 40 CFR part 280 or an approved state UST program under 40 CFR part 281, must still be included in the diagram in accordance with §112.7(a)(3).

This diagram also includes an example of how manufacturing equipment and complex piping may be represented on a facility diagram. The diagram references the more detailed diagrams and plans of the piping and manufacturing equipment that are available separately at the facility. For more information on ways to represent these systems, please see Section 6.2.6, Piping and Manufacturing Equipment, above.

Finally, while not required to be included in the diagram, this example facility diagram also includes a reference to the calculation of diked storage provided in other parts of the SPCC Plan and depicts wastewater treatment systems, secondary containment, and oil/water separators.

**Figure 6-4.** Example facility diagram, including manufacturing equipment, complex piping, and completely buried storage tanks.



**Table B-3.** Volume and contents of tanks and containers identified on the facility diagram. Please see facility diagram to identify the areas below.

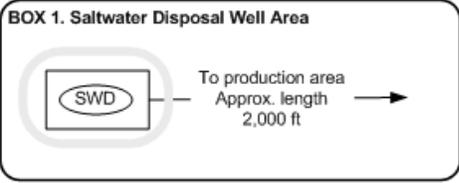
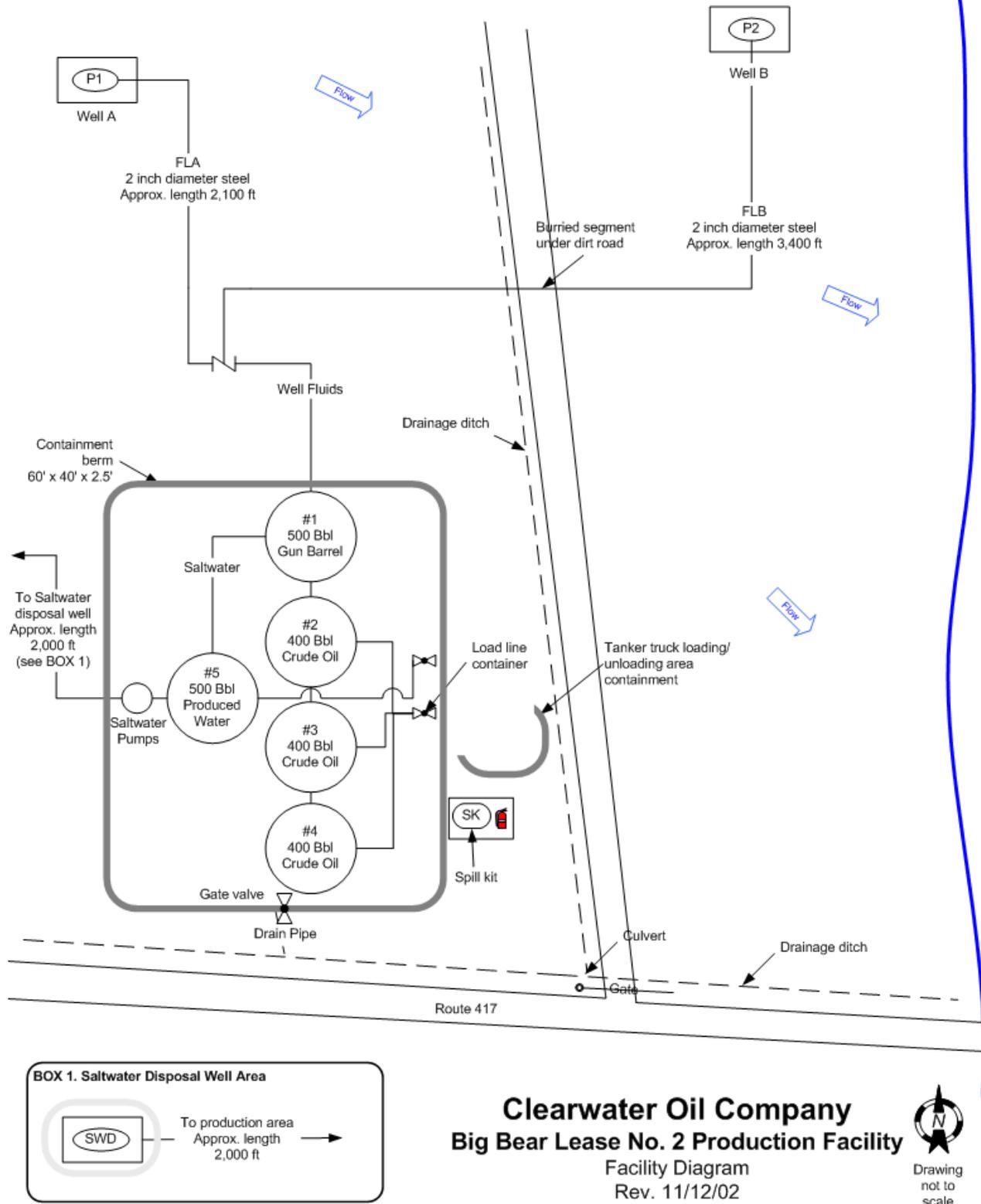
| Tank/Container                                    | Volume (gallons) | Contents                       |
|---|------------------|--------------------------------|
| <b>Area A – Raw Material Bulk Storage</b>         |                  |                                |
| Tank 1  | 4,000            | Product A – #2 fuel oil        |
| Tank 2  | 4,000            | Product A – #2 fuel oil        |
| Tank 3  | 20,000           | Product B – #6 fuel oil        |
| Tank 4  | 20,000           | Product B – #6 fuel oil        |
| Tank 5  | 20,000           | Product B – #6 fuel oil        |
| Tank 8  | 6,000            | Product C – Kerosene           |
| Tank 9  | 40,000           | Solvent – Toluene              |
| <b>Area B – Finished Product Bulk Storage</b>     |                  |                                |
| Tank 6  | 20,000           | Product D – proprietary oil    |
| Tank 7  | 20,000           | Product D – proprietary oil    |
| <b>Area C – Electrical Equipment</b>              |                  |                                |
| Transformer E1                                    | 235              | Silicon-based dielectric fluid |
| Transformer E2                                    | 235              | Silicon-based dielectric fluid |
| <b>Area D</b>                                     |                  |                                |
| Liquid Product Accumulation Tank                  | 10,000           | Product D – proprietary oil    |
| <b>Process Area</b>                               |                  |                                |
| Primary Reactor                                   | 500              | intermediate oil product       |
| Distillation                                      | 500              | intermediate oil product       |
| Direct Contact Cooling                            | 500              | intermediate oil product       |
| Stripping   | 500              | intermediate oil product       |
| Pump/Tank   | 300              | intermediate oil product       |
| Condenser Liquifier                               | 500              | intermediate oil product       |
| <b>Underground Storage Tanks</b>                  |                  |                                |
| Tank 9 (otherwise exempt from SPCC requirements)  | 8,000            | gasoline                       |
| Tank 10 (otherwise exempt from SPCC requirements) | 8,000            | gasoline                       |
| Tank 11   | 2,000            | heating oil                    |

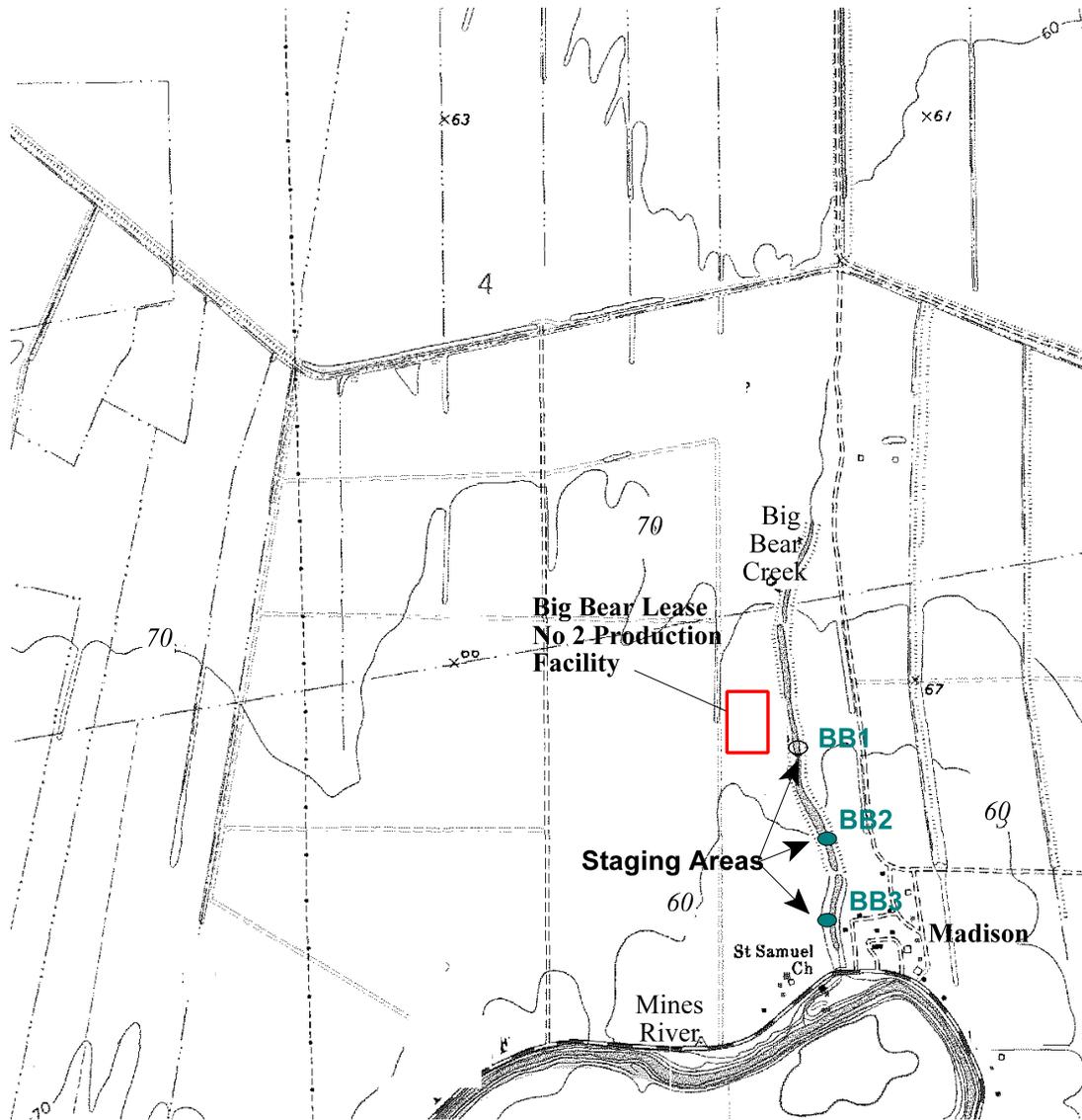
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### 6.3.3 Example #3: Oil Production Facility

Figure 6-5 is an example facility diagram for a small oil production facility with two extraction wells and a production tank battery. As required by §112.7(a)(3), this diagram includes all containers with a storage capacity of 55 gallons or greater and transfer areas. Because the facility has a relatively large footprint, the direction of flow is best displayed on a separate figure that shows the general location of the site relative to receiving waterbodies (Figure 6-6).

Figure 6-5. Example facility diagram for a production facility.





**Figure 6-6.** Example general facility location diagram for a production facility.

## 6.4 Review of a Facility Diagram

### 6.4.1 Documentation by Owner/Operator

By certifying an SPCC Plan, a PE attests that he/she is familiar with the requirements of 40 CFR part 112, that the Plan has been prepared in accordance with good engineering practice, following the requirements of 40 CFR part 112, that the Plan is adequate for the facility, and that he or his agent visited the facility. Thus, if an SPCC Plan is certified by a PE and the facility diagram is consistent with the rule requirements, it will most likely be considered acceptable by regional inspectors. However, if the diagram does not meet these standards of common sense, the facility design has changed, the supporting drawings for a simplified diagram are not available at the facility, or the diagram appears to be inadequate for the facility, appropriate follow-up action may be warranted. This may include a request for more information or a Plan amendment in accordance with §112.4(d).

### 6.4.2 Role of the EPA Inspector

The inspector should verify that the diagram accurately represents the facility layout and provides sufficient detail as outlined in §112.7(a)(3), and use it as a guide for the containers and piping inspected during the site visit.

The EPA inspector should verify that the diagram included in the Plan includes:

- Location and contents of each container (except those below the *de minimis* container size of 55 gallons as described in Section 6.2.3, above).
- Completely buried tanks, including those that are otherwise exempt from the SPCC rule by §112.1(d)(4).
- All transfer stations and connecting pipes (allowing the flexibility as described in Section 6.2.6, above).

Although EPA generally stated in both the preamble of the 2002 SPCC rule (67 FR 47097) and in §112.7(a)(3) that *all* facility transfer stations and connecting pipes that handle oil must be included in the diagram, it is reasonable to allow flexibility on the method of depicting concentrated areas of piping and manufacturing equipment on the facility diagram. These areas may be represented in a more simplified manner, as long as more detailed diagrams (such as blueprints, engineering diagrams, or process charts) are available at the facility. The inspector may ask to review more detailed diagrams of piping and manufacturing equipment if further information is needed during a site inspection.